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Serial: RNP-RA/14-0081

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10 CFR 50.73

Attn: Document Control Desk
United States Nuclear Regulatory Commission
Washington, DC 20555-0001

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/RENEWED LICENSE NO. DPR-23

LICENSEE EVENT REPORT NOS. 2013-001-01, 2013-003-01, 2014-001-01 REVISIONS TO
INCLUDE AND/OR CLARIFY REQUIRED INFORMATION

Ladies and Gentlemen:

Pursuant to 10 CFR 50.73, Duke Energy Progress, Inc. is submitting the attached Licensee Event Report revisions. The revisions provide additional information required by 10 CFR 50.73(b)(2)(ii)(F), 10 CFR 50.73(b)(2)(ii)(J) and NRC Form 366, Item 13. Should you have any questions regarding this matter, please contact Mr. R. Hightower, Manager - Nuclear Regulatory Affairs at (843) 857-1329.

This submittal contains no new Regulatory Commitments.

Sincerely,

W. R. Gideon
Site Vice President
H. B. Robinson Steam Electric Plant, Unit No. 2

WRG/jmw

Attachments:

- I. LER 2013-001-01: Non-Environmentally-Qualified Splice Rendered Post Accident Monitoring Instrumentation Channel Inoperable
 - II. LER 2013-003-01: Reactor Trip on 4KV Bus Undervoltage During Load Transfer
 - III. LER 2014-001-01: Reactor Trip Due to a Two-out-of-Three Logic Signal from Steam Generator Water Level Protection Train B Logic Matrix
- c: V. McCree, NRC, Region II
Ms. Martha C. Barillas, NRC Project Manager, NRR
NRC Resident Inspector, HBRSEP, Unit No. 2

US NRC Document Control Desk
Attachment II to Serial: RNP-RA/14-0081
4 pages (including this cover page)

H. B. ROBINSON STEAM ELECTRIC PLANT UNIT 2

LICENSEE EVENT REPORT NO. 2013-003-01

REVISION TO REACTOR TRIP ON 4KV BUS UNDERVOLTAGE DURING LOAD TRANSFER



LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of
digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME

H. B. Robinson Steam Electric Plant, Unit No. 2

2. DOCKET NUMBER

05000 261

3. PAGE

1 OF 3

4. TITLE

Reactor Trip on 4KV Bus Undervoltage During Load Transfer

5. EVENT DATE

MONTH	DAY	YEAR
11	05	2013

6. LER NUMBER

YEAR	SEQUENTIAL NUMBER	REV NO.
2013	003	01

7. REPORT DATE

MONTH	DAY	YEAR
08	05	2014

8. OTHER FACILITIES INVOLVED

FACILITY NAME	DDCKET NUMBER
	05000

FACILITY NAME	DOCKET NUMBER
	05000

9. OPERATING MODE

1

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT

R. Hightower, Manager - Nuclear Regulatory Affairs

TELEPHONE NUMBER (Include Area Code)

(843) 857-1329

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU- FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU- FACTURER	REPORTABLE TO EPIX
A	EA	BKR	WSTGHSE	Y	X	BI	P	Johnston	Y

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE) ☒ NO15. EXPECTED
SUBMISSION
DATE

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

At 1801 hours EST on 11/5/2013, with the Unit in Mode 1 at 19% power, H. B. Robinson Steam Electric Plant, Unit No. 2 (HBRSEP2) experienced an automatic reactor trip while operators were transferring loads from the Startup Transformer to the Unit Auxiliary Transformer (UAT), as part of activities associated with coming on line and increasing power following Refueling Outage 28. During the coordinated breaker operation, the reactor tripped when an anomaly occurred that resulted in the actuation of two undervoltage relays associated with the loss of 2 of 3 4KV buses. The 'A' Emergency Diesel Generator (EDG) auto-started and supplied the E-1 emergency bus as a result of the undervoltage transient. The event was reported as a 4 hour Non-Emergency report per 10 CFR 50.72 (b)(2)(iv)(B) due to the valid Reactor Protection System Actuation, and as an 8 hour Non-Emergency report per 10 CFR 50.72(b)(3)(iv) (A) due to the valid actuation of Auxiliary Feed Water and EDG auto-start and subsequent starting of required undervoltage loads, save 'A' Service Water Pump.

The investigation into the cause of this event determined that advanced aging/fatigue of the phenolic operating rods of the UAT breaker (52/7) caused the failure of the 'B' phase operating rod, which prevented closure of the 'B' phase of the breaker. The cause of the failure of the 'A' Service Water Pump to sequence onto the E-1 bus during the blackout sequence was attributed to a loose wire termination in the Emergency Control Station (ECS). Immediate corrective actions consisted of assessment of the switchyard and E-1 Bus, inspection of Breaker 52/7, and securing the loose wire termination in the ECS. This event did not impact the health and safety of the public.

**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
H. B. Robinson Steam Electric Plant, Unit No. 2	05000 261	YEAR	SEQUENTIAL NUMBER	REV NO.	2 OF 3
		2013	- 003	- 01	

NARRATIVE**PLANT IDENTIFICATION**

Westinghouse - Pressurized Water Reactor

BACKGROUND

At 1801 hours EST on 11/5/2013, with the unit in Mode 1 at 19% power and no involvement of out-of-service structures, systems or components, H. B. Robinson Steam Electric Plant (HBRSEP2) experienced an automatic reactor [RCT] trip while operators were transferring loads from the Unit Startup Transformer (SUT) [XFMR] to the Unit Auxiliary Transformer (UAT) [XFMR], in accordance with plant procedures. During the coordinated breaker operation, the reactor tripped when an anomaly occurred that resulted in the actuation of two undervoltage relays [RLY] associated with the loss of 2 of 3 4KV buses [BU]. By design, the one running 'A' Main Feedwater Pump [P] tripped and caused the auto-start of the Auxiliary Feedwater System (AFW), which maintained Steam Generator [SG] water levels within the normal operating band. The 'A' Emergency Diesel Generator (EDG) [DG] auto-started and supplied the E-1 emergency bus [BU] as a result of the undervoltage transient.

The event was reported as a 4 hour Non-Emergency report per 10 CFR 50.72(b)(2)(iv)(B) due to the valid Reactor Protection System Actuation, and as an 8 hour Non-Emergency report per 10 CFR 50.72(b)(3)(iv)(A) due to the valid actuation of AFW and EDG auto-start and subsequent starting of required undervoltage loads, save 'A' Service Water (SW) Pump [P].

EVENT DESCRIPTION

At 1801 hours EST on 11/5/2013, with the Unit in Mode 1 at 19% power, HBRSEP2 experienced an automatic reactor trip while operators were transferring loads from the SUT to the UAT, in accordance with plant procedures. When the breaker (52/7) control switch [33] connecting the UAT to 4KV Bus 1 [BU] was taken to the 'close' position, indication on the Reactor Turbine Generator Board (RTGB) [MCBD] went from 'Open' to no indication. The 52/7 breaker's 'A' and 'C' phases closed, however 'B' phase operating rod had failed thereby inhibiting closure of the 'B' phase of the breaker. When the 52/7 control switch was returned to center position, breaker 52/12 [BKR], Incoming Line - Startup Transformer to 4KV Bus 2 [BU], tripped open per normal controls. When breaker 52/12 opened, the 'B' phase current on Reactor Coolant Pumps (RCPs) [P] 'A' and 'C' dropped from approximately 500 amps to 76 amps. As designed, the relays for buses 1 and 2 tripped at a setpoint equal to 75% of nominal bus voltage. Reactor trip signal logic directs a reactor trip when 2 out of 3 4KV bus undervoltage relays trip. As a result of the 'B' phase current drop on RCPs 'A' and 'C' and the subsequent trip of their associated undervoltage relays, an automatic reactor trip occurred. The turbine [TG] automatically tripped due to the reactor trip causing the turbine stop valves [V] to close while the switchyard generator output breakers [BKR] 52/8 and 52/9 remained closed. With the turbine stop valves closed while the switchyard breakers were closed, the 60-second time delay pick-up relays initiated and timed out resulting in Generator Lockout Relay 86BU [RLY] tripping and closing breaker 52/12. Normal voltage was restored to 4KV buses 1 and 2 when breaker 52/12 closed. The voltage drop on the 4KV buses was sufficient to pick up the E-1 Bus undervoltage relays and initiate the blackout sequence on Bus E-1. The 'A' EDG auto-started and the 'A' EDG load sequencer [PMC] loaded the required Engineered Safety Features loads onto E-1 with the exception of the 'A' SW Pump, which should have started as part of the sequence.

CAUSAL FACTORS

The root cause of the reactor trip event is advanced aging/fatigue of breaker 52/7 phenolic operating rod materials. Degradation of the rod materials caused failure of the 'B' operating rod, which prevented closing of breaker 52/7. The failure of the 'A' SW Pump to start was due to a loose wire termination in the Emergency Control Station. The loose termination was attributed to a historical condition based on maintenance records searches going back more than fifteen years that did not identify any work performed in this particular Emergency Control Station.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
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NARRATIVE

CORRECTIVE ACTIONS

Completed:

- Interim corrective action to address rod failure involved inspection and or replacement of operating rods in all four incoming breakers that are part of the fast bus transfer logic between the UAT and SUT.
- The 'A' SW pump loose terminal connection in the Emergency Control Station was secured.

Planned:

- Long term corrective action to prevent recurrence consists of replacing the operating rods for all 4KV incoming breakers with high tensile strength operating rods. Action Request (AR) 642282. Assignment Nos. 05 & 06.

SAFETY ANALYSIS

The risk consequences of this event were minimal based on the successful reactor trip and operators' ability to successfully start SW Pump 'D' [P] after SW Pump 'A' failed to start as expected. SW Pump 'A' remained available by a manual start and the transient was not complicated by additional equipment failures, malfunctions or human errors.

The reactor was at 19% power, and power ascension following completion of the refueling outage was in progress. Therefore, the decay heat load was well below that of a full-power trip after a period of operation and therefore well within the capabilities of the decay heat removal systems. In addition, AFW actuation had been demonstrated successfully in the previous period of plant operation, and no corrective or preventive maintenance had been performed on that system since that time. The Condensate Storage Tank [TK] capacity was adequate to remove the above decay heat load for an extended period before requiring refill. Backup sources of feedwater were available and important accident mitigation equipment remained available throughout this event.

ADDITIONAL INFORMATION

An internal Operating Experience (OE) search for related events at HBRSEP2 was conducted; no similar events were identified. An evaluation of external OE shows that this event would not have been prevented by available OE, therefore this was not considered a missed opportunity to utilize OE.

Energy Industry Identification System (EIIIS) codes for systems and components relevant to this event are identified in the text of this document within brackets [].